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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,956	03/24/2004	Stewart Edward Hooper	YAMAP0918US	4086
43076	7590	03/23/2006	EXAMINER	
MARK D. SARALINO (GENERAL) RENNER, OTTO, BOISSELLE & SKLAR, LLP 1621 EUCLID AVENUE, NINETEENTH FLOOR CLEVELAND, OH 44115-2191			SAYADIAN, HRAYR A	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/807,956	Applicant(s) HOOPER ET AL.	
	Examiner Hrayr A. Sayadian	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on June 28, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

CLAIM REJECTIONS - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 6, 8, 10, 14, 15, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Pat. No. 6,885,690 to Aggerstam et al. [hereinafter "Aggerstam"].

With respect to Claim 1:

As to claim interpretation: The feature "over" in claim 1 is read broadly to include above another element but not necessarily directly/immediately over another element. See claim 4, reciting an element "disposed directly on ...," which supports broadly interpreting the scope of "over" as recited in claim 1.

As to art rejection: Aggerstam discloses a semiconductor laser device comprising: a substrate (the GaAs substrate shown in FIG. 2 of Aggerstam) a first mirror structure disposed over a first surface of the substrate (the n-DBR AlGaAs with High/Low Al concentration shown in FIG. 2); an active region disposed over the first mirror structure (the QW active region shown in FIG. 2); a second mirror structure disposed over the active region (the layers p-DBR AlGaAs with High/Low concentration, the p-contact and the etch stop, and the dielectric stack shown in FIG. 2); and a first contact disposed on a second surface of the substrate (the n-contact on the bottom of the GaAs substrate shown

in FIG. 2); wherein the second mirror structure has a first portion (the p-DBR AlGaAs with High/Low concentration) having a first width and a second portion (the dielectric stack shown in FIG. 2) having a second width less than the first width (FIG. 2 shows the width of the dielectric stack being less than the width of the p-DBR AlGaAs with High/Low concentration), the first portion being disposed between the second portion and the active region (as shown in FIG. 2); wherein an etching stop layer (the anti-reflective etch stop shown in FIG. 2) is disposed over the first portion of the second mirror structure (as shown in FIG. 2), the second portion of the second mirror structure being disposed over the etching stop layer (as shown in FIG. 2); and wherein a second contact (the p-contact shown in FIG. 2) is disposed over at least part of the surface of the first portion (as shown in FIG. 2) of the second mirror structure not covered by the second portion (as shown in FIG. 2) of the second mirror structure.

With respect to Claims 2 and 3:

See Aggerstam FIG. 2 showing a cross section of the disclosed semiconductor laser and column 3, lines 13-16, disclosing the second contact (the p-contact) being symmetric and annular.

With respect to Claim 6:

See Aggerstam column 4, lines 61-67, disclosing the etching layer as anti-reflecting Al₂O₃, which is a material having a bandgap greater than that for AlGaAs and therefore is non-absorbing or is substantially non-absorbing for light having a wavelength equal to the intended emission wavelength of the semiconductor laser using the AlGaAs/GaAs MQWs.

With respect to Claims 8 and 10:

See Aggerstam column 5, lines 53-59, disclosing the anti-reflecting etching stop layer Al₂O₃ as having the optical path length of $\lambda/4$.

With respect to Claims 14 and 15:

See Aggerstam FIG. 2 showing the first mirror structure (the n-DBR AlGaAs with High/Low Al concentration) comprising doped n-type AlGaAs layer and the second

mirror structure (the p-DBR AlGaAs with High/Low concentration, forming part of the second mirror structure) comprising doped p-type AlGaAs layer.

With respect to Claim 23:

The semiconductor laser device Aggerstam discloses is a VCSEL, see the first sentence of the Abstract.

CLAIM REJECTIONS - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aggerstam in view of PGPUB U.S. 2004/0144984 by Knigge et al. [hereinafter "Knigge"].

Aggerstam does not disclose disposing the second contact directly on the etching stop layer.

Knigge however discloses the inserting of a protective etch stop layer under the contact layer to protect the DBR layers having Al-content from oxidation. See Knigge left side of page 2, ¶ [0044].

It would therefore have been obvious to modify the disclosure in Aggerstam by disposing the second contact directly on an etching stop layer to protect the DBR layer below the etch stop layer from oxidation.

5. Claims 5, 7, 9, 11, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aggerstam in view of U.S. Pat. No. 5,379,312 to Bour et al. [hereinafter "Bour"].

With respect to claims 5, 17, and 18 (claim 17 directly depending from claim 5, and claim 18 directly depending from claim 17):

Aggerstam discloses using an etching stop layer but does not specifically disclose using an etching stop layer that is a strained semiconductor layer (which semiconductor layer is GaInP as additionally recited in claims 17 and 18).

Bour however discloses that etch selectivity and optical transparency is improved when using a strained GaInP semiconductor as an etching stop layer. See Bour column 4, lines 42-47, summarizing the advantages of using strained GaInP semiconductor layer as an etch stop (Bour detailing the advantages in column 3, line 12 to column 4, line 42).

It would therefore have been obvious to modify the disclosure in Aggerstam by an etching layer that is a strained GaInP semiconductor etch stop layer for better etch selectivity and optical transparency.

With respect to claim 7, which directly depends from claim 5:

It is noted that Bour's disclosed improvement in transparency using strained GaInP etch stop layer cannot be achieved if absorption by the strained etch stop layer is not less for the emission wavelength of the laser device. The additional recitation in claim 7 therefore is inherently met by the strained etch stop layer being GaInP, as disclosed by Bour.

With respect to claim 9, which directly depends from claim 5:

Aggerstam meets the additional recitation in claim 9, see for example the rejection above for claim 8.

With respect to claim 11, which directly depends from claim 7:

Aggerstam meets the additional recitation in claim 11, see for example the rejection above for claim 8.

6. Claims 12, 13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aggerstam in view of U.S. Pat. No. 5,557,627 to Schneider, Jr. et al. [hereinafter "Schneider"].

With respect to claim 12 and 19:

Aggerstam does not disclose the laser device further comprising a cap layer (which is GaAs as additionally recited in claim 19, which directly depends from claim 12) disposed over the second mirror structure.

Schneider however discloses that a thin (e.g. 10 nm) GaAs cap layer may be grown above the second DBR mirror to prevent oxidation of the underlying AlGaAs (forming the second mirror). See, for example, column 11, lines 12-18.

It would therefore have been obvious to modify the disclosure in Aggerstam by a disposing a GaAs cap layer over the second mirror structure to prevent oxidation of the underlying AlGaAs DBR forming the second mirror structure.

With respect to claim 13, which directly depends from claim 12:

The recitation "wherein the cap layer has thickness of less than 10 nm" in claim 13 is anticipated by Schneider disclosing growing a thin (e.g., 10 nm) GaAs cap layer because the disclosure of 10 nm thickness allows for a thickness of slightly less than 10 nm, which in turn reads on the additional recitation in claim 13. See, for example, In re Woodruff, 16 USPQ 1934 (Fed. Cir. 1990). Additionally, the thickness being less than 10 nm is close enough in value to the thickness being 10 nm so that one skilled in the art would have expected laser devices having a cap thickness of less than 10 nm and another laser device having a cap thickness of 10 nm to have the same properties. See, for example, Titanium Metal Corp of America v. Banner, 227 USPQ 773 (Fed. Cir. 1985).

7. Claims 16 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aggerstam in view of U.S. Pat. No. 6,829,272 to Najda [hereinafter "Najda"].

With respect to claim 16:

Aggerstam does not disclose the active layer of the laser device comprising an (Al,Ga)InP layer structure.

Najda however discloses using a laser device using an active layer comprising (Al,Ga)InP (see for example the first sentence of the Abstract) to emit light in the visible range (see, for example, column 13, lines 37 to 44).

It would therefore have been obvious to modify the disclosure of Aggerstam to have the active layer comprise (Al,Ga)InP to have the laser device emit light in the visible range.

With respect to claims 20-22:

Aggerstam does not disclose a laser device emitting in the ranges 600 nm – 700 nm, 630 nm – 680 nm, and 650 nm – 660 nm, respectively.

Najda however discloses a laser device emitting in the ranges of about 630 nm – 680 nm and about 630 nm – 650 nm using (Al,Ga)InP active layer laser devices. See, for example, column 13, lines 37-44. And Najda recognizes such laser devices as important components of professional and consumer products. See, for example, column 1, lines 11 to 18.

It would therefore have been obvious to modify the disclosure in Aggerstam by using an (Al,Ga)InP active layer laser device to emit light in the ranges of about 630 nm – 680 nm (which reads on claims 20 and 21) and about 635 nm – 650 nm (which reads on claim 22; see the legal precedents cited in explaining the rejection of claim 13).

ADDITIONAL PRIOR ART OF RECORD

8. U.S. Pat. Nos. 6,534,331 to Liao et al. discloses using GaAs cap layer having a thickness of 5-10 nm to protect underlying layers from oxidation.

CLOSURE

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hrayr A. Sayadian whose telephone number is (571) 272-7779. The examiner can normally be reached on Monday through Friday, 7:30 am to 4:00 pm, ET.

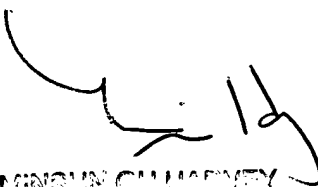
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun O. Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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MINHUN CHHAPNEY
PRIMARY EXAMINER